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22 May 2015

Ms. Rachelle Thompson
U.S. Environmental Protection Agency - Region 9
Superfund Division
75 Hawthorne Street
Mail Code SFD 7-3
San Francisco, CA 94105

Subject: Comments on United Heckathorn Superfund Site Draft Focused Feasibility Study (FFS)
EPA #: CAD981436363

Dear Ms. Thompson:

On behalf of Levin-Richmond Terminal Corp. and Levin Enterprises, Inc. (LRTC), Haley & Aldrich, Inc. and Weiss Associates have prepared the following comments on the *Draft Focused Feasibility Study, United Heckathorn Superfund Site*, Richmond, Contra Costa County, California, prepared by CH2MHill on behalf of the U.S. Environmental Protection Agency (EPA), February 2015, referred to herein as the "Draft FFS."

All parties share an interest in the success of the remedy selected for the Lauritzen Channel. We understand that remedial design is conceptual at the feasibility study stage. However, given the recontamination of the Lauritzen Channel after the 1996-1997 remedy, this particular feasibility study warrants a more detailed approach than what is included in the current Draft FFS. There are five significant data gaps that should be addressed in revising the draft FFS:

- **Unacceptable Assumptions for Dredged Material Processing, Transport, and Disposal**

  The Draft FFS (Appendix G, Tables G-2a,b,c) indicates that dredged material processing will occur in an upland "area provided by the Client (PRP)." The FFS provides no information about which potentially responsible party (PRP) will provide this area. IF EPA assumes that LRTC's marine terminal will be available, that assumption is unreasonable and unacceptable. Assuming LRTC's operations during the remediation are similar to its current operations, LRTC does not have adequate space available to support the dredge material processing area and water treatment system proposed in the Draft FFS. Nor can LRTC's operations accommodate the truck/rail traffic that would be required to transport the material off site.

- **Inadequate Delineation of Dredge Depth and Boundary**

  There appears to be a delineation data gap near the mouth of the Lauritzen Channel. Also, concentrations of total DDT in some samples of older bay mud (OBM) exceed the proposed remedial goal (RG) of 400 µg/kg total DDT. There appears to be inadequate data to vertically delineate those areas where dredging will have to extend into the OBM to meet the proposed RG.

- **Inadequate Evaluation and Source Control for Stormwater Outfalls**

  The limited existing data set does not include wet season samples, other than annual storm water monitoring for LRTC outfalls. However, the transport of potentially contaminated stormwater solids occurs in the wet season when storm water is flowing. Potential recontamination due to public and private (non LRTC) stormwater outfalls must be investigated and addressed prior to channel remediation.

- **Insufficient Proposed Extent of the Embankment Cap Along the Eastern Shoreline**

  Multiple surface sediment and embankment samples beneath the LRTC Pier but south of the proposed Pier Remediation Area have total DDT concentrations exceeding the proposed 400 µg/kg RG. This area must be addressed.

- **Insufficient Evaluation of Shoreline Cap Designs Compatible with Site Conditions**

  The proposed shoreline cap beneath the Pier Area is described as a 3-inch thick layer of active material, covered with an armoring layer, both placed by clamshell bucket. Such a cap cannot be placed beneath the Pier where a steep embankment is obstructed by many pilings and covered by varying-size rip rap.

Recommendations for addressing these data gaps are provided in the comments below. General comments are presented first, followed by specific comments organized by FFS section. We look forward to the opportunity to review a revised Draft FFS that includes sufficient detail to allow for a comprehensive review of remedial options and selection of a preferred alternative that will be effective and implementable.

GENERAL COMMENTS

1. Inadequacy of Figures Showing Nature and Extent of Impacts

The figures included in the Draft FFS and supporting appendices do not adequately convey the extent of contamination within the Lauritzen Channel. A foundational component of any FS document should be a comprehensive presentation of the full geographic extent of available data, showing those areas where concentrations of contaminants of concern (COCs) exceed the RGs, and those areas where COC concentrations are below the RGs. The Draft FFS presents historical sediment data in Figures 2-2 and 2-3 but the Section 3 figures only show the 2013 data collected as part of the Source Identification Study (SIS). The selective presentation of only 2013 data in the Conceptual Site Model (Section 3) leads to a potentially incomplete or inaccurate understanding of the Site conditions.

Draft FFS Figures 2-2 and 2-3 (also included as SIS Figures 3-2a and 3-2b) have the most comprehensive data presentations (albeit without the most recent data), but they do not include the Lauritzen Channel site boundary, proposed remediation area boundaries, upland source control areas, or any other information that would allow the reader to determine whether the proposed remedial areas are appropriate given the available data. In addition, these two figures are difficult to read because the surface sediment results (arguably the most important since they are the concentrations in direct contact with potential receptors) are the smallest symbols.

The FFS should include comprehensive figures overlaying all of the elements required to evaluate whether or not the proposed remedial action is appropriate and sufficient. Two example figures showing total DDT concentrations in surface sediment and embankment samples, along with remedial area information are attached (Figures A and B). It is important to recognize that we did not have access to the FFS database and therefore were only able to compile information found in the Draft FFS and associated attachments. It is possible that samples are missing from these figures and/or that features such as the stormwater system are not accurately mapped. However, these figures show the following elements that should be considered for a more comprehensive evaluation of the proposed remedy:

- Lauritzen Channel site boundary;
- Upland cap and excavation areas;
- Stormwater system, indicating location where stormwater solids have been analyzed;
- Stormwater outfalls and groundwater seeps;
- Areas dredged or partially dredged during the 1996-1997 sediment remedy;
- All available surface sediment (including shoreline) data collected since the completion of the 1996-1997 sediment remedy, indicating concentrations above and below the proposed RG (400 µg/kg); and
- Proposed remediation areas (seven areas discussed in the Draft FFS).

The FFS should include a similar set of figures with all of these components, verified to ensure that all available data are included. The FFS should also include similar sets of figures showing subsurface data, one showing all available subsurface data for younger bay mud (YBM) and another showing all available data for OBM. These figures are critical for evaluating whether there are sediment characterization data gaps, whether the proposed remedial boundaries encompass all of the contaminated sediment, and whether the proposed dredging depths are sufficient to remove all of the contaminated sediment.

The FFS should similarly include a comprehensive figure summarizing available data outside of the Lauritzen Channel so that the reader can evaluate whether or not the southern boundary of the proposed remedial action is appropriate. An example is attached (Figure C). This figure includes both in-place samples and data from sediments that were subsequently dredged by LRTC during 2006, 2009, and 2012 maintenance dredging. These data no longer represent concentrations of in-place sediment, but they do provide sediment concentration information which are indicative of what may be expected if current conditions continue. Station names are provided on Figure C for reference. Data from multiple depth intervals are shown using concentric circles.

2. Inadequacy of Conceptual Approach Details for the Proposed Remediation and Source Control Measures

The conceptual approach for the proposed remediation and source control measures presented in the Draft FFS does not contain sufficient detail to demonstrate a complete evaluation of potential

alternatives. Per the USEPA's guidelines[1], a sufficiently detailed conceptual approach is required to analyze whether the proposed remedies and technologies are the most appropriate, given the constraints of the Site conditions and the complexities of the remediation approach. Given the recontamination of the Lauritzen Channel after the 1996-1997 remedy, a more detailed approach is warranted for this particular feasibility study. For example, only one conceptual cap design (a thin active capping layer, with or without a geotextile) is proposed for all shoreline areas. However, it is likely that a particular cap design that may be suitable on the exposed shoreline in the Northern and Southern Piles area will not necessarily be appropriate for the Pier Area. The FFS would benefit by expanding the analysis to consider additional cap designs.

For each conceptual cap design evaluated in the revised Draft FFS, Site-specific information, such as the existing embankment toe and top elevations, shoreline slope, and surface features (e.g., rip rap, bulkheads, sheet pile, etc.) should be provided to scale in revised versions of Figures 6-2a and 6-2b (and new diagrams as needed) for the various shoreline areas. Superimposed over the existing conditions, the figures should show the proposed sheet pile location, height, and size, as well as the conceptual design of the proposed cap. These cross sections should show required modifications to the existing slope, the thickness of the embankment cap, and how the active cap would tie in to the upland cap.

3. Insufficient Evaluation of Construction Techniques Using Site-Specific Data

The Draft FFS provides an insufficient evaluation of the proposed construction techniques. All three remedial alternatives are identical, except for the Northern Head Area, and all are presented with a moderate to high ranking for long-term effectiveness and performance, as well as short-term effectiveness (see Section 6.3 and Table 6-2 and Table 6-3). To meaningfully evaluate an alternative and support a ranking of "high" for effectiveness and performance, a sufficiently detailed conceptual approach that takes into account actual Site conditions is warranted. Alternatives should be developed that acknowledge the need for different construction design and techniques to address varying conditions in different areas of the Site.

As indicated in the Draft FSS, the potential exists for sediment suspension during remediation, and while the assertion is that it can be adequately managed with standard industrial best management practices (BMPs) (Table ES-1), the risks of entraining (or not properly containing) contaminated sediment during construction are not adequately evaluated. The difficulties of installing the proposed embankment cap are not properly analyzed. And, no discussion is provided regarding how the remedy components in different areas of the Site will be integrated. The difficulties that would be encountered installing the embankment cap as currently described, particularly in the LRTC Pier Area, do not support ranking either

[1] In Section 6.2.2 of the *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*, USEPA, October 1988, the USEPA states that "[t]he level of detail required to analyze each alternative against these evaluation criteria will depend on the type and complexity of the site, the type of technologies and alternatives being considered, and other project-specific considerations. The analysis should be conducted in sufficient detail so that decision makers understand the significant aspects of each alternative and any uncertainties associated with the evaluation (e.g., a cost estimate developed on the basis of a volume of media that could not be defined precisely)."

the short-term effectiveness or the long-term effectiveness and permanence as "high" in any of the proposed alternatives.

COMMENTS ON SECTION 3, CONCEPTUAL SITE MODEL

4. Stormwater Outfalls as a Source of Contamination

Section 3.2.2.1 states that "the pipes, outfalls and seeps do not appear to be ongoing source of DDT contamination to the Lauritzen Channel under dry weather conditions" – which is not surprising since these features "do not convey dry weather flow." It appears that no wet weather stormwater system samples were collected as part of the SIS, other than the annual storm water monitoring LRTC conducts for their outfalls. In addition, the stormwater system has not been adequately mapped. These omissions present a significant data gap in the identification of potential recontamination sources because seasonal stormwater flow may transport significant quantities of DDT to the Channel sediments.

Prior to remediating the Lauritzen Channel, the stormwater system should be comprehensively mapped and first-flush stormwater system samples should be collected from all outfalls that are not sealed, to determine whether or not wet-weather stormwater runoff is transporting DDT-contaminated particulates to the channel. These should include either samples of stormwater solids, or whole water samples with significant turbidity. In the latter case, the solid particles can be centrifuged out of the whole water samples and analyzed.

5. Vertical Extent of Contamination

Section 3.3.1 of the Draft FFS asserts that the OBM is "uncontaminated except where disturbed by dredging or other anthropogenic activity" and therefore does not need to be remediated (Section 6.2). However, there is limited data to validate this assertion, or to determine where it has been "disturbed by … anthropogenic activity". It appears that the Draft FFS relied solely on the results of the 2013 sampling presented in Table 3-1. A total of only seven intact OBM-only samples were collected. One of these (from SD13-19) exhibited a total DDT concentration of 4,116 µg/kg, an order of magnitude higher than the proposed RG. Four other samples designated "YBM/OBM" had total DDT concentrations greater than 7,000 µg/kg (from cores SD13-09, SD13-10, SD13-23, and SD-13-24, with 11,421 µg/kg, 45,020 µg/kg, 17,500 µg/kg, and 7,139 µg/kg, respectively). Furthermore, several of the cores where OBM was not identified, had total DDT concentrations above 5,000 µg/kg in the deepest interval sampled. Additionally, the 2012 samples along the LRTC's Berth A (Figure C) were collected from elevations of -41 to -45 MLLW and consisted largely of OBM, but nonetheless had total DDT concentrations ranging from 55 to 550 µg/kg total DDT.

Therefore, the data presented in the Draft FFS appear insufficient to delineate the dredging depth necessary to meet the proposed RG of 400 µg/kg total DDT. Without additional data, the estimate of total dredging volume in the Draft FFS may be a lower bound, with a reasonable probability of a much greater actual dredge volume (see comment 17). Additional sampling with equipment appropriate for deeper penetration is warranted to develop a more accurate estimate of total dredge volume. Underestimation of the volume of material that will need to be removed has significant ramifications with

regard not just to cost, but also construction duration, , handling of the dredged material, community disturbance, disposal options, and the possibility of leaving significant quantities of contaminated sediment in place.

COMMENTS ON SECTION 4, REMEDIAL ACTION OBJECTIVES AND REMEDIATION GOALS

6. Applicable or Relevant and Appropriate Requirements (ARARs)

The identification of ARARs in the Draft FFS (Table 4-5) is incomplete in that it doesn't identify all ARARs or identify specific requirements within each ARAR.

Additional action- and location-specific ARARs exist which are not specifically identified. For example, the "Programmatic Essential Fish Habitat (EFH) Conservation Measures for Maintenance Dredging Conducted Under the San Francisco Bay Long Term Management Strategy (LTMS) Programand "Transportation of Hazardous Materials" outlined in United States Code, Title 49, Chapter 51, Section 5101-5127, and Code of Federal Regulations, Article 49, Sections 172.3 and 172.200-700 should both be considered.

As stated in comment 24, LRTC has entered into a Consent Decree with San Francisco Baykeeper with specific requirements related to water discharges by LRTC, which should be included as an ARAR. Other examples likely exist which are not listed here.

In addition, determination as to which substantive requirements of the laws, regulations, etc., cited are applicable, relevant, or appropriate is missing from the Table 4-5. For example, the Endangered Species Act is cited, but the species potentially occurring which could be impacted by the remediation are not identified.

7. Southern Boundary of the Remediation Area

Section 4.6 of the Draft FFS states "[c]oncentrations of total DDT in the Santa Fe Channel are below the sediment RG," but this appears unsupported. The Draft FFS appears to rely only on three sediment cores collected during the 2013 SIS sampling, which included only one on the northeastern side of the channel upstream from the Lauritzen Channel and none on the northeastern side of the channel downstream from the Lauritzen Channel. The proposed remediation (dredging) area ends just north of the mouth of the Lauritzen Channel. However, there is a significant data gap in this area. Based on currently available data from this and previous studies (see Figures B and C), the entire area within the Lauritzen Channel Site boundary should be included within the remediation boundary to meet the proposed RG. Additional sediment samples should be collected to delineate the southern extent of the remediation area.

Hydrographic surveys (e.g., Draft FFS Figure 3-1) show sediment accretion at the mouth of the Lauritzen Channel, in the area where the turbidity barrier was installed during the 1996-1997 remediation, suggesting that DDT-impacted sediment suspended during the 1996-1997 dredging may have settled in this area. At least two in-place surface sediment samples, and one recently dredged sample, within the Lauritzen Channel Site boundary, but outside the proposed dredging footprint, had total DDT concentrations exceeding the proposed RG of 400 µg/kg (Figure C). This data gap should be addressed

through the collection of additional sediment samples to bound the southern extent of the remediation area.

Additionally, based on RG exceedances observed in whole core homogenates collected off of LRTC Berth A (Figure C), consideration should be given to extending the remediation boundary along the northeastern side of the Santa Fe Channel south of the Lauritzen Channel. This should be evaluated in conjunction with the sampling described above, to delineate of the southern remedial dredge area boundary.

COMMENTS ON SECTION 5, IDENTIFICATION AND SCREENING OF REMEDIATION TECHNOLOGIES

8. Screening of Remedial Technologies – Dredging Methods

Hydraulic dredging should not have been eliminated during the technical screening evaluation (Draft FFS Table 5-3). While this technology may not be appropriate for dredging the central portion of the Lauritzen Channel, it may be required to successfully dredge immediately adjacent to the sheet pile walls that are proposed to be installed at the toe of the embankment along the north end and eastern shoreline of the Channel. Typically a dredge bucket can only be operated within approximately 4 to 6 inches of a wall. In addition, the sediment in "corrugations" of the sheet pile walls cannot be effectively removed with a dredge bucket.

Similarly, mechanical dredging will not work immediately adjacent to the existing bulkheads along the western shoreline of the channel. Success of the proposed remedy is contingent on removal of all of the contaminated sediment from shoreline to shoreline so that no un-dredged "residual" contaminated sediments are left to recontaminate the Lauritzen Channel, as happened after the 1996-1997 remedy. This may require either hand work (micro-dredging) or hydraulic dredging to clean up the shoreline areas after the mechanical dredging has been completed.

9. Screening of Remedial Technologies – Treatment and Disposal Options

Although only limited information is provided, it appears that the Technology Screening Evaluation (Draft FFS Table 5-3) independently evaluated each General Response Action for effectiveness, implementability, and cost. This resulted in the selection of "ex situ stabilization and solidification" as the only retained Treatment Option for dredged sediment, and "transportation to an off-site landfill" as the only retained Disposal Option. Therefore, this is the only combination included in the Alternatives evaluated in the Draft FFS (Table 6-2). However, the Treatment and Disposal Response Actions are not independent of each other and must be considered together.

In order for the dredged sediments to be transported by truck or rail to an off-site landfill, they need to undergo ex situ stabilization. The Draft FFS estimates that 100,000 square feet of space will be required for dredged material stabilization and water treatment (Table G-2a, Appendix G of the Draft FFS). The Draft FFS does not identify where this dredged material will be processed, or even identify potential options. LRTC is not aware of any property in the immediate area available for such use. Placing the dredged material processing facility on the LRTC property, assuming operations are similar to current

conditions, is not an option because it would occupy a significant portion of the property and result in economically prohibitive interruptions to LRTC operations (see comment 24).

All feasible remedial technologies for Treatment and Disposal should be retained at the Technology Screening Step. They can subsequently be combined into plausible combinations that can be evaluated based on effectiveness, implementability, and cost. Combined Treatment and Disposal alternatives that should be considered include:

- Transporting sediments by barge to an off-site rehandling facility for ex situ treatment, followed by truck or rail transport to an off-site landfill.
- Performing the ex situ treatment (dewatering and stabilization) on a barge, and then barging the sediments to an off-site landfill.
- Disposing of the dredged sediment in a confined aquatic disposal (CAD) cell created by overdredging the federally maintained upper reach of the Santa Fe Channel.
- On-site containment of some sediment behind a sheet pile wall beneath the LRTC Pier (see comment 19).

COMMENTS ON SECTION 6, DEVELOPMENT AND ANALYSIS OF REMEDIAL ALTERNATIVES – REMEDIAL DESIGN

10. Description of Remedial Alternatives – Differentiation of Remedial Action vs. Source Control

As shown in SIS Figure 8-1, the Lauritzen Channel site boundary includes the shoreline/embankment areas, beginning at the top of the slope on all sides of the Channel (reproduced in Figure C). Addressing all areas of contamination within the Site boundary should be part of the "Remedial Action." Addressing potential sources of recontamination from outside the Site boundary should be components of the "Source Control" measures.

Therefore, the proposed activities to remove and/or cap the embankment soils in the North End, Northern Piles, Southern Piles, and Pier Areas should not be referred to as "source control" in Section 6.2 or subsequent sections of the FFS. These remedial areas are all part of the Lauritzen Channel Remedial Action. This is in contrast with activities such as cleaning out and upgrading the municipal and private stormwater systems, which are source control measures.

11. Feasibility of Dredging the Entire West Side and Northern Head Areas

We agree that remediation of the West Side and Northern Head Areas must extend all the way to the western shoreline of the Lauritzen Channel. However, a significant portion of the western side of the Channel (Draft FFS Figures 2-2 and 2-3) was not dredged in 1996-1997. The attached photographs (Figure D) show current conditions of the western shoreline of the Lauritzen Channel, including the cracked seawall north of Manson's facility and the overhanging dock structures and other obstructions along the shoreline.
An evaluation of the seawall supporting the northwestern bank of the Lauritzen Channel should be conducted to determine whether it is possible to dredge immediately adjacent to the Channel boundary

without destabilizing the seawall. If the seawall is not sufficiently robust, alternative remedial designs should be evaluated. Methods for remediating the sediments where access is restricted due to docks, pilings, and other structures also need to be evaluated. Assuming that dredging remains the preferred alternative, appropriate equipment and procedures should be identified to ensure successful dredging of the entire area.

12. Extension of Shoreline Pier Remediation Area to Mouth of Lauritzen Channel

The proposed shoreline remediation areas (Figure 6-1A of the Draft FFS) should be extended to include the entire eastern shoreline of the Lauritzen Channel. Figure B shows that there are at least nine or ten surface samples collected from beneath the Pier but south of the proposed Pier Remediation Area which have total DDT concentrations exceeding the proposed 400 µg/kg RG. The Pier Remediation Area should be extended to include all areas beneath the LRTC Pier, from the Southern Piles Area to the mouth of the Channel.

13. Sequencing of Source Control and Remedial Elements

One of the contributing factors to the failure of the 1996-1997 remediation of the Lauritzen Channel was that the dredging was conducted before upland source control measures were complete. In addition, the channel was dredged from south to north, which meant that the initial dredged areas could not be protected from water column residuals generated by later dredging. As described in the USEPA Sediment Remediation Guidance (2005), source control must be completed prior to sediment remediation.

Section 6.2 of the FFS should explicitly specify that the proposed remediation activities be completed in the following order:

1. All public and private stormwater outfalls should be sampled, cleaned as needed, and then resampled. If DDT-containing particulates continue to be found in the system, end of pipe controls should be installed to capture the particulates so they are not discharged into the Lauritzen Channel (see comments 14 and 15).
2. Unused pipes should be sealed, non-structural piles should be removed, and structural wooden piles should be stabilized to prevent weathering of DDT-containing particulates (see comments 15, 16, and 25).
3. The shoreline and embankment caps should be constructed and sheet pile should be installed in the North End, Northern and Southern Piles, and Pier Areas.
4. The City outfall will need to be extended to discharge beyond the North End shoreline cap. If a capping option is chosen in the Northern Head Area, the outfall will also have to be constructed so that discharge does not to damage that cap.
5. Finally, the sediments within the remaining Lauritzen Channel should be dredged, beginning in the north and proceeding to the south. In addition to installing turbidity controls south of the dredging area, turbidity controls can be installed north of the working area to protect previously-dredged areas.

14. Source Control – Municipal Stormwater System

Section 6.2.3.3 states that it is estimated that approximately 100 tons of sediment would be removed from the city stormwater system, but no information is provided as to the cleaning method, the portion of the stormwater system to be cleaned, or the basis for the 100 ton estimate.

DDT is highly hydrophobic and, therefore, sorbs to particulates rather than dissolving in water. For this reason, samples of stormwater solids provide the best means of identifying portions of the stormwater system that have the potential to discharge DDT-contaminated particulates to the Lauritzen Channel. Figure A shows the municipal stormwater system as depicted on SIS Figure 6-1. Results from the limited sampling of stormwater solids (as reported in SIS Figure 6-2) are shown as colored squares. Three stormwater solids samples exceeded the proposed RG of 400 µg/kg, and a fourth was approximately 70% of the proposed RG. These samples define the portion of the system with demonstrated DDT impacts (shown in dark orange on Figure B). Three other stormwater solids samples had little or no DDT, demonstrating that portions of stormwater system are unimpacted (shown in dark green on Figure A).

Significant portions of the system, downstream of the existing samples have not been characterized (shown in light green on Figure B). Nor has then system been adequately mapped. Capping of a catch basin or manhole does not address residual contamination within the pipes left in place. Groundwater infiltration can mobilize that material and transport it to the associated outfall.

Either additional storm water solids samples should be collected, or all lines shown in dark red and light green should be included in the cleaning program. Before remediating the Lauritzen Channel, these lines should be cleaned and then resampled after a significant storm event to demonstrate that the municipal stormwater system is not an ongoing source of contamination. If the system cannot be adequately cleaned, an end-of-pipe control should be considered to ensure that DDT-contaminated particulates are not discharged from the system.

15. Source Control – Other Outfalls

Section 6.2.3.3 specifies that source control measures will include "[r]emoval or sealing of non-functional pipes and outfalls along the eastern shoreline" but does not specify how many of these pipes/outfalls are still active and will remain in place. The five LRTC stormwater outfalls include stormwater interceptors to prevent direct discharge to the Lauritzen Channel (FFS Section 1.2.1). However, 23 additional pipes/seeps are shown on FFS Figure 1-2, five of which are on the western side of the channel and will presumably not be considered for removal or sealing. Section 2.10.4 cites Table 2-3, which was missing from the version of the Draft FFS that was reviewed. It is assumed that it is the same as SIS Table 3-1. Before remediating the Lauritzen Channel, all private stormwater lines, on both sides of the Channel, should be mapped, sampled, and cleaned/resampled as necessary (similar to the municipal stormwater system) to demonstrate that they are not ongoing sources of contamination.

16. Source Control - Wood Pilings

Section 6.2.3.3 of the Draft FFS does not include source controls relative to the structural wood pilings that will left in place. Wood chip samples were analyzed from five pilings (SIS Figure 5-1) and concentrations of total DDT in all five samples were orders of magnitude higher than the remedial goal of 400 µg/kg. In the absence of additional sampling data, it must be assumed that wood chips from all pilings would exceed the remedial goal. Therefore all wooden pilings that are not removed should be stabilized to prevent wood chips from weathering and releasing DDT-contaminated material into the Lauritzen Channel sediment. It does not appear that stabilization methods were evaluated. One option that is feasible and has long-term permanence is to cover each piling with an impermeable sleeve and backfill the annulus around the piling. The FFS should include evaluation of options and provide sufficient design detail to evaluate the constructability, permanence, and estimated cost for this source control element.

17. Estimates of Dredge Volume

Of the 24 cores collected during the SIS, only nine identified the OBM layer (FFS Table 3-1). Thus, the YBM thickness was estimated in many areas, which introduces a significant degree of uncertainty regarding the Draft FFS's estimate of the dredge volume necessary to remove all of the Lauritzen Channel YBM (Section 6.2.3.1). The Draft FFS does not include information as to how the YBM thickness was interpolated between the sparse data points.

During the 1996-1997 dredging event, LRTC paid to deepen the area along Berth B by removing accreted sediments to an elevation of -39 MLLW. All material above this elevation must be recently-deposited YBM, which provides a minimum YBM thickness along the eastern side of the Lauritzen Channel. Furthermore, sampling data suggest that the dredging will have to include OBM in some areas to meet the proposed RG (see comment 5).

Also, the volume estimates presented in the Draft FFS do not appear to include an overdredge allowance, which is standard dredging procedure to ensure that the minimum dredge thickness is removed throughout the remediation area. The dredge volumes and associated costs should be re-calculated with reasonable estimates of the uncertainty in the YBM volume, the volume of OBM that may need to be removed, and the necessary overdredge allowance. This will help avoid a situation similar to what happened during the first remedial action. The 1994 Feasibility Study (Pacific Northwest Laboratory, 1994, page 4.15) predicted 54,000 cubic yards of YBM would be dredged, but over 105,000 cubic yards were removed during the 1996-1997 remedy (Completion Report, Chemical Waste Management, 1997, p. 7).

18. Dredging – Equipment Selection

Section 6.2.3.1 specifies that an environmental dredging bucket will be used for all mechanical dredging within the Lauritzen Channel. However, an environmental dredging bucket is unlikely to be able to "bite" into the dense OBM. As stated in Section 2.2.3 (page 7) of the Third Five-Year Review Report (CH2MHill, 2011), inability to penetrate into the OBM was one of the factors identified as contributing to failure of the 1997 remedy ("although mechanical dredging was used effectively remove YBM within accessible

portions of the Lauritzen Channel, dredging equipment was not able to penetrate into Older Bay Mud surfaces").

Both to achieve appropriate overdredge depth (thus ensuring that all YBM is removed) and to remove DDT-contaminated OBM where necessary (see comment 5), alternative bucket types (i.e., with cutting teeth and active closing action) should be evaluated. Appropriate containment of dredge residuals will be required to mitigate potential releases to the water column during dredging, but this potential risk is more than outweighed by the potential risk of leaving un-dredged "residual" contaminated sediments that can recontaminate the Lauritzen Channel, as happened after the 1996-1997 remedy.

In addition, as discussed in comment 8, hydraulic dredging (or another method) will likely be required to clean up the shoreline areas after the mechanical dredging has been completed. This should be discussed in the FFS text and included in the cost estimates.

19. Sheet Pile Wall Design

The underwater sheet pile walls would present a potential navigation hazard and could cause scour erosion at open ends. The sheet pile wall design must include measures to eliminate navigational hazards presented by unmarked, underwater sheet pile wall to vessels traveling within the Lauritzen Channel and berthing at the LRTC Pier. Water circulation behind the open-ended sheet pile wall and the potential for scouring and erosion associated with the wall should be addressed.

Also, significant debris and pile foundations exist in the areas proposed for sheet pile installation. These obstructions could cause construction difficulties and cost overruns. Test borings and/or installation of sheet pile pilot sections should be considered so that the feasibility of this proposed design can be appropriately evaluated.

If the current design (with the addition of measures to prevent vessels from contacting the sheet piles) is adopted, the sheet pile wall at the base of the embankment beneath the LRTC Pier needs to be installed sufficiently close to the pilings to allow ships to continue to use the Pier. This may require specialized equipment to drive the piles beneath the Pier structures. Existing rip rap may have to be removed to allow the piles to be placed landward of the ship berths, which may destabilize the embankment. LRTC should be included in the discussion of how to overcome these and other access and design issues related to the embankment cap beneath the Pier.

An alternative sheet pile wall and cap configuration may be more effective. For example, the revised Draft FFS should consider raising the top of the sheet pile wall to the top of the LRTC dock and placing fill behind the sheet pile wall to effectively fill and cap the entire shoreline beneath the Pier.

20. Cap Design in the Embankment Areas

Draft FFS Figures 6-2a and 6-2b present a generic cartoon of cap components that are proposed for Northern Piles, Southern Piles and Pier Areas. These figures indicate that a thin "permeable capping material for chemical isolation layer" will be placed over the existing embankment surface. Section 6.2.3.3

and Appendix G describe this as a 3-inch thick layer of active material (10% organic carbon), covered by a geotextile in the Northern and Southern Piles Areas. Based on the information included in the Draft FFS, it appears that this isolation layer would be placed over the existing embankment.

Based on existing Site conditions and structural features, such a conceptual capping approach is not constructible. A uniform three inch thick layer of fine-grained material cannot be placed on a surface that includes varying-size rip rap, and placement of a geotextile on the existing rip rap will likely result in ripping the fabric. One solution could be to place a leveling layer (fine stone or coarse sand with engineering elements to keep the material from sliding down the slope) to create a smooth subgrade on which to place the active cap material and geotextile.

In addition, it is not clear how the proposed cap will seal around the piles that will remain in place in the Pier Area (Figure 6-2a). To adequately keep impacted soil/sediment in place, the active cap material must make a tight seal, which must be maintained, around each piling. In addition, where the embankment is steep, engineering controls must be put in place to keep the active cap material from sliding.

Figures 6-2a and 6-2b also specify a "rip rap or armor layer" which Appendix G indicates will consist of a 6 inch layer of sand and a 12 inch layer of rip rap. It is unclear how this armoring layer can be kept in place on the steep slopes. An articulated concrete mat could provide an alternative and limit thickness of the cap. However, installing the mat around pilings left in place will be complicated. In general, construction under the Pier will be a challenge because of the difficult and limited access (see comment 23). Since the embankment sediments were one of the main factors contributing to recontamination of the Lauritzen Channel after the 1996-1997 remedy, a more complete design is required before the proposed remedial alternatives, including the shoreline caps, can be adequately evaluated.

21. Allowance for Future Maintenance of LRTC's Pier and Shoreline

Placement of the sheet pile wall and active cap will impact long term maintenance of LRTC's shoreline improvements. Future substructure maintenance of the northern rail gate will require pile-driving and other potential disturbance of the cap. With the current cap design, pile maintenance, replacement, and installation will be required beneath the wood decking in the LRTC Pier Area. The institutional controls and cap maintenance plan must allow for long-term maintenance of LRTC's shoreline facilities, which may include disturbance (penetration) of the shoreline cap.

22. Evaluation of Applicable or Relevant and Appropriate Requirements

The evaluation of alternatives does not have an adequate assessment of compliance with ARARs. The only discussion of ARARs in Chapter 6 is a conclusory statement in Table 6-2, which states with regard to alternatives 2, 3, and 4: "Alternative can be designed to comply with the substantive requirements of the ARARs." Any analysis of compliance is lacking.

In Table 6-2, all ARAR's are considered as a single item, and each individual ARAR is not specifically applied to each alternative. It is also unclear which aspects of the alternatives each ARAR applies to. In its 1988 Guidance for Conducting Remedial Investigation/Feasibility Studies under CERCLA, EPA suggests that each

alternative be evaluated for compliance with each location-, chemical- and action-specific ARAR (Table E-1). While it is understood that the RIFS Guidance does not mandate a strict requirement, we believe that EPA should apply this guidance and conduct a more specific analysis of ARARs to allow for a meaningful way to differentiate between the alternatives. Without meaningfully demonstrating how each alternative does indeed attain compliance with ARARs, the Draft FFS fails to meet the intent of the National Contingency Plan (NCP) [Code of Federal Regulations, Article 40, Section 300.430(e)(2)(i)A)], which requires that "alternatives […] be assessed to determine whether they attain applicable or relevant and appropriate requirements."

In some cases, the alternatives described do not appear to meet the ARARs. However, this is not clear from the limited analysis presented. For example, the dredging footprint described in all three alternatives will leave in place sediment with total DDT concentrations exceeding the proposed RG (see comments 5, 7 and 12). A more detailed analysis of compliance with ARARs will identify these gaps in compliance, and allow the remedial design to be revised so that the selected alternative complies with all ARARs.

COMMENTS ON SECTION 6, DEVELOPMENT AND ANALYSIS OF REMEDIAL ALTERNATIVES – REMEDY IMPLEMENTATION

23. Under-Pier Cap Construction

Placement of an active cap using a clamshell bucket (as specified in Section 6.2.3.3. and Appendix G of the Draft FFC) is not feasible in the Pier Area. Installation of the proposed cap using a clamshell bucket would require removal of the deck at the LRTC's Berth B to allow for clamshell access. Even if the decking were removed, existing piles, pile caps, and stringers prohibit controlled placement of cap material with a clamshell bucket.

These features also limit the ability to excavate the embankment beneath the LRTC Pier to form a stable slope on which to construct a cap. A feasible method for placing the cap beneath the dock must be established before this measure can be considered implementable or effective (in the long- or short-term). An alternative capping approach (e.g., sheet pile wall with fill as described in comment 19) should be considered.

24. Dredged Material Processing

The Draft FFS specifies a 100,000 square-foot dredge processing area in an upland "area provided by the Client (PRP)." EPA apparently assumes that property in the vicinity of the site will be available for this purpose and appears to contemplate use of the LRTC property. This is not a reasonable assumption. The Draft FFS does not identify any properties in the area available for the proposed dredge material processing. A suitable property must be identified in order to evaluate the feasibility and cost of the proposed remedy.

If EPA contemplates use of the LRTC marine terminal for this purpose, there are significant if not insurmountable difficulties with such use. During the 1996-1997 remedial activities, dredged material

was dewatered, processed, and dried at the LRTC facility. Since that time, LRTC has spent millions of dollars installing the upland source control cap and has invested significant resources into terminal upgrades, such as new and improved rail operations, new docks, deck repairs, new pavement, and new/upgraded concrete surfaces. LRTC has also invested millions of dollars in storm water treatment and pollution prevention infrastructure. The area needed to accommodate the proposed dredge material processing and wastewater treatment would occupy nearly all of the terminal space, severely impacting terminal operations, with potentially catastrophic economic impacts for LRTC.

Also, LRTC has also entered into a Consent Decree with San Francisco Baykeeper with specific requirements related to water discharges by LRTC. The Draft FFS does identify the Consent Decree as an ARAR, and does not evaluate whether use of the LRTC property is even possible given the constraints of the Consent Decree.

In summary, if LRTC's operations during the remediation are similar to its current operations, dredged material processing and water treatment cannot be accommodated on the LRTC property for the following reasons:

- Insufficient space is available to handle the volume of sediment anticipated (which is likely to be an underestimate – see comment 17)
- Disruption of LRTC operations for an extended period could have irreparable financial consequences
- The existing upland cap could become compromised
- Dewatering and water treatment could detrimentally affect LRTC's stormwater management and would be incompatible with LRTCs Consent Decree with San Francisco Baykeeper
- It would be very difficult to build containment around the rail lines to allow loading of railcars
- Months to years could be required to process the dredged material

25. Institutional Controls and Long-Term Monitoring to Maintain Caps

The bathymetric scour feature observed in the Northern Head Area (FFS Figure 3-1) demonstrates that current Site use is inconsistent with a cap in this area. Institutional controls will need to be put in place to maintain the caps in all areas where they are installed. The FFS should include a discussion of current Site uses and any current activities that may need to be restricted as a result of each of the remedial alternatives. This information is necessary for adequate evaluation of the proposed alternatives. The FFS should also indicate the monitoring and maintenance requirements for the proposed caps (in the Northern Head, Piles Areas, Pier Area, and Northern End should that be the selected alternative), and who will be responsible for the monitoring/maintenance.

26. Quantity Estimates – Southern Piles, and Pier Areas

All three Alternatives (2, 3, and 4) in the Draft FFS specify identical treatment of the Southern Piles, and Pier Areas. However, the cost estimates in Tables G-2a, G-2b, and G-2c (Appendix G of the Draft FFS) list varying material quantities for the pile removal, sheet pile wall, rip rap, and geotextile. Multiple

comments provided above point to the need for a more complete and Site-specific cap design before costs can be updated. However, when this is done, the tables should be carefully checked.

Also, the basis for the number of piles to be removed is not provided in these tables. Table G-2a assumes a total of 120 piles will be removed from the Northern and Southern Piles Areas, while Tables G-2b and G-2c assume only 20 will be removed. None of the cost estimates assume any piles will be removed from the Pier Area, although nonstructural piles are observed in the field. Deteriorated piles may be present at or above the mud line and have been observed spaced on 18-inch centers. LRTC supports the removal of nonstructural piles, and requests that the basis for estimation of the number of piles be provided and cost estimates for removal of piles be updated.

27. Assumptions in Cost Estimates

The cost estimates included in Appendix G contain multiple unrealistic assumptions, including material volumes, availability of equipment, unit costs, activity durations, etc. Once more detailed conceptual designs are developed for a revised set of alternatives, all of these assumptions should be critically reviewed and revised. Acknowledging that remediation cost estimates at the feasibility stage need only be accurate to plus 50 to minus 30 percent, the cost estimates should be sufficiently accurate to allow meaningful evaluation of the alternatives.

CLOSING

We very much appreciate the opportunity to provide these comments to the Draft FFS and look forward to continuing to work with USEPA to implement an effective remediation.

Sincerely yours,
HALEY & ALDRICH, INC.

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NORTHERN HEAD

WEST SIDE

EAST SIDE

SURFACE SEDIMENT OR EMBANKMENT SAMPLE (0 - 0.5 FT BSS)

STORMWATER SYSTEM SOLIDS SAMPLE

TOTAL DDT CONCENTRATION (µg/kg)

- 0 - 50
- 50 - 150
- 150 - 400
- 400 - 5,000
- > 5,000

LRTC STORMWATER OUTFALL

MUNICIPAL STORMWATER OUTFALL

OTHER PIPE AND SEEP LOCATIONS

CATCH BASIN

MANHOLE

STORMWATER LINE

STORMWATER LINE WITHOUT SOLIDS DDT DATA

STORMWATER LINE WITH DEMONSTRATED DDT IMPACTS

FORMER EXCAVATION AREA

APPROXIMATE EXTENT OF UPLAND CAP

LAURITZEN CHANNEL SITE BOUNDARY

AREA DREDGED IN 1996-1997

AREA PARTIALLY DREDGED IN 1996-1997

AREA NOT DREDGED IN 1996-1997

PROPOSED REMEDIATION AREAS (DRAFT FFS)

- NORTH END AREA
- NORTHERN PILES AREA
- SOUTHERN PILES AREA
- PIER AREA
- DREDGING AREA (LABELLED)

NOTES

1. AERIAL IMAGERY SOURCE: ESRI
2. µg/kg = MICROGRAMS PER KILOGRAM
3. FT BSS = FEET BELOW SEDIMENT SURFACE
4. STORMWATER SYSTEM INFORMATION FROM SIS (SOURCE IDENTIFICATION STUDY) FIGURES 6-1 AND 6-2
5. FFS = FOCUSED FEASIBILITY STUDY

N

0 120 240

SCALE IN FEET

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DDT IN SURFACE SEDIMENT, EMBANKMENT SOIL, AND STORMWATER SOLIDS NORTHERN LAURITZEN CHANNEL

MAY 2015

FIGURE A

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WEST SIDE

EAST SIDE

SURFACE SEDIMENT OR EMBANKMENT SAMPLE (0 - 0.5 FT BSS)

TOTAL DDT CONCENTRATION (µg/kg)

- 0 - 50
- 50 - 150
- 150 - 400
- 400 - 5,000
- > 5,000

- LRTC STORMWATER OUTFALL
- MUNICIPAL STORMWATER OUTFALL
- OTHER PIPE AND SEEP LOCATIONS
- STORMWATER LINE WITHOUT SOLIDS DDT DATA

- FORMER EXCAVATION AREA
- APPROXIMATE EXTENT OF UPLAND CAP
- LAURITZEN CHANNEL SITE BOUNDARY
- AREA DREDGED IN 1996-1997
- AREA PARTIALLY DREDGED IN 1996-1997
- AREA NOT DREDGED IN 1996-1997

PROPOSED REMEDIATION AREAS (DRAFT FFS)

- NORTH END
- NORTHERN PILES AREA
- SOUTHERN PILES AREA
- PIER
- DREDGING AREA (LABELLED)

N

0 120 240

SCALE IN FEET

NOTES

1. AERIAL IMAGERY SOURCE: ESRI
2. µg/kg = MICROGRAMS PER KILOGRAM
3. FT BSS = FEET BELOW SEDIMENT SURFACE
4. STORMWATER SYSTEM INFORMATION FROM SIS (SOURCE IDENTIFICATION STUDY) FIGURES 6-1 AND 6-2
5. FFS = FOCUSED FEASIBILITY STUDY

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DDT IN SURFACE SEDIMENT AND EMBANKMENT SOIL SOUTHERN LAURITZEN CHANNEL

MAY 2015

FIGURE B

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ALL INFORMATION PRESENTED ON THIS FIGURE WAS DERIVED FROM SUMMARY REPORTS AND HAS NOT BEEN VERIFIED

NORTHERN HEAD
WEST SIDE
EAST SIDE
303.4
RIH-2008-6-4
SF-31
SANTE FE CHANNEL
SD13-39
G3+00
RIH-2008-6-3
SF-29
SD13-40
SF-34
LRTC-DU1-1
LRTC-DU1-2
LRTC-DU1-3
LRTC-DU1-4
LRTC-DU1-5
RIH-2008-6-2
SF-32
SD13-41
LRTC-2009-1 TO 4
LRTC-2006-BERTH A-1 TO 5
LRTC-2006-SHORE-1 TO 5
PC-1
PC-2
PARR CANAL
PC-3
PCW
RIH-2012-6-3 & RIH-2012-6B-1
RIH-2008-6-1
RIH-2012-6-4 & RIH-2012-6B-2
INNER RICHMOND HARBOR
RIH-2012-6-1 & RIH-2012-6A-2
RIH-2012-6-2 & RIH-2012-6A-1

SEDIMENT SAMPLE

TOTAL DDT CONCENTRATION (µg/kg)

- 0 - 50
- 50 - 150
- 150 - 400
- 400 - 5,000
- > 5,000

SYMBOL SIZE INDICATES DEPTH INTERVAL

- SURFACE
- SUBSURFACE YBM
- ABOVE DREDGED DEPTH WITH OBM INCLUDED
- BELOW DREDGE DEPTH (Z-LAYER SAMPLES)

WHERE MULTIPLE SAMPLES WERE COLLECTED IN A GIVEN DEPTH INTERVAL, HIGHEST CONCENTRATION IS SHOWN

- FORMER EXCAVATION AREA
- APPROXIMATE EXTENT OF UPLAND CAP
- LAURITZEN CHANNEL SITE BOUNDARY
- AREAS DREDGED IN 2006, 2009, AND/OR 2012

PROPOSED REMEDIATION AREAS (DRAFT FFS)

- NORTH END
- NORTHERN PILES AREA
- SOUTHERN PILES AREA
- PIER
- DREDGING AREA (LABELLED)

NOTES
1. AERIAL IMAGERY SOURCE: ESRI
2. OBM = OLDER BAY MUD
3. FT BSS = FEET BELOW SEDIMENT SURFACE
4. YBM = YOUNGER BAY MUD
5. FFS = FOCUSED FEASIBILITY STUDY
6. µg/kg = MICROGRAMS PER KILOGRAM

N

0 400 800
SCALE IN FEET

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DDT CONCENTRATIONS (2006-2013) OUTSIDE PROPOSED REMEDIAL DREDGING AREA

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FIGURE C

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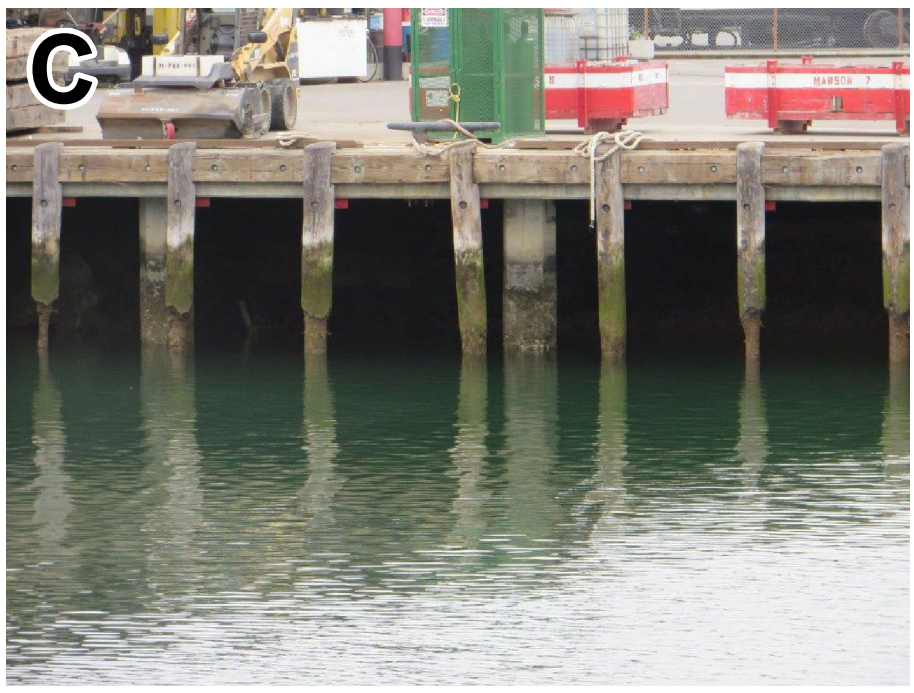

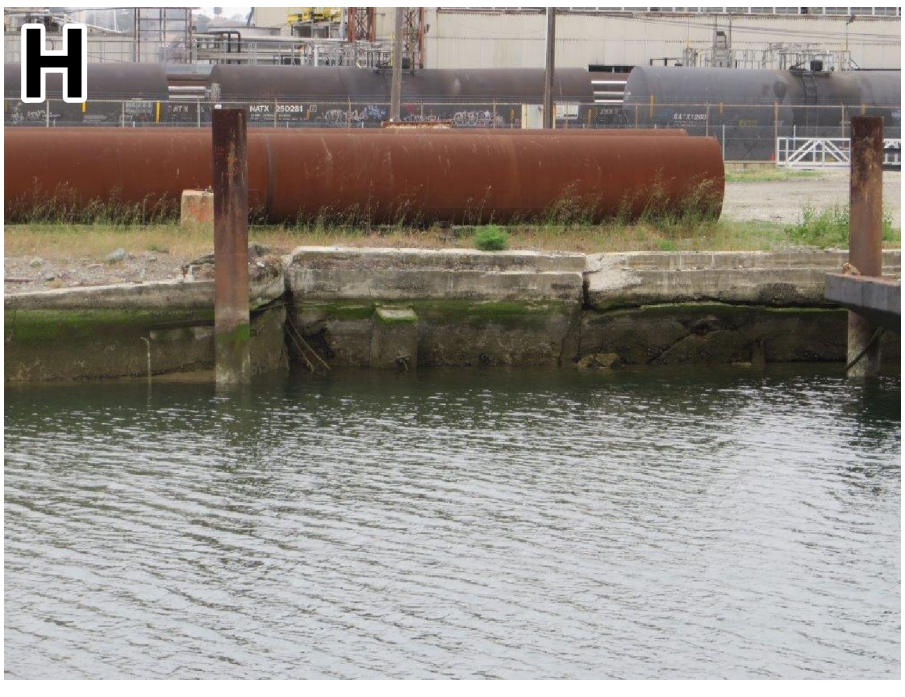

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PHOTOGRAPHS (SOUTH TO NORTH) OF CURRENT CONDITIONS ALONG THE WESTERN SHORELINE OF THE LAURITZEN CHANNEL

MAY 2015

FIGURE D